International Review of Economics and Finance 48 (2017) 289–308

Contents lists available at ScienceDirect

International Review of Economics and Finance

journal homepage: www.elsevier.com/locate/iref

Sudden stops of capital flows to emerging markets: A new prediction approach☆

Sangwon Suh

School of Economics, Chung-Ang University, The Republic of Korea

ARTICLE INFO

JEL classification:
C53
F21
F37

Keywords:
Early warning system
Signal extraction
Logistic regression
Capital flows
Sudden stop

ABSTRACT

In this paper, we propose a new prediction approach for forecasting sudden stop events of capital flows to emerging countries. The new approach is to combine conventional approaches (signal extraction and statistical regression approaches) to maintain their advantages. We apply the new approach as well as conventional approaches to actual data and conduct prediction performance comparisons. The empirical results show that the new approach significantly improves prediction ability. The new approach is proven to have some potential merit as an alternative approach to improving prediction ability and can also be applied to various types of financial crisis events.

1. Introduction

An event of extreme financial turmoil, often referred to as a financial crisis, typically entails significant costs to an economy.[1] A financial crisis can occur in various sectors of an economy; e.g., crisis in the banking sector (banking crisis) and in the external sector (foreign currency crisis). To effectively respond to a financial crisis, it is critical to accurately predict a potential financial crisis. Correct predictions can help agents make better economic decisions. As a response to the recent global financial crisis (GFC), the G20 asked the IMF and the Financial Stability Board to collaborate on regular early warning exercises to assess low-probability but high-impact risks to the global economy and to identify policies to mitigate them in November 2008.

The GFC differs from previous financial crises in that it originated in the U.S. financial markets while most others occurred in emerging market economies (EMEs). Based on the unique characteristics of the GFC, there exist suspicions that indicators found to be useful predictors in previous crises are not useful to predict the GFC. However, Frankel and Saravelos (2012) (and other studies) show that some typical leading indicators are also useful predictors of the GFC. This result implies the worthiness of efforts for a better early warning system.

Given that financial crises not only incur huge costs but also tend to recur, we have observed a large body of literature that tries to improve the ability of predicting financial crises, and this effort is continuing. Although many studies have been conducted that predict financial crises, two approaches have mainly been used for the prediction: the signal extraction (SE) approach and the

☆ The author thanks Kyongwook Choi, Jinill Kim, Taehoon Lim, Alfred Mettler, Hail Park, Antonin Rusek, Chi-Young Song, and an anomynous referee for the extensive and insightful comments on earlier versions. The auther also greatly benefitted from comments by the seminar participants at 2016 Annual Meeting of Korea Money and Finance Association, the Bank of Korea, and 81st International Atlantic Economic Conference for their helpful comments and suggestions. The author thanks Byung-Soo Koo for his help gathering data. This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2015S1A5A2A01009141).

E-mail address: ssuh@cau.ac.kr.

[1] Refer to Cerra and Saxena (2008), IMF (2009), and Laeven and Valencia (2012) among others.

http://dx.doi.org/10.1016/j.iref.2016.12.013
Received 13 April 2016; Received in revised form 15 December 2016; Accepted 17 December 2016
Available online 21 December 2016
1059-0560/

statistical regression (SR) approach.[2]

The SE approach individually monitors information variables and extracts signals in a nonparametric way from the perspective of predicting financial crises and then constructs a composite index based on the individual informativeness of the variables. This approach has the advantage of including a large number of potential information variables. Because of its nonparametric characteristics, however, we cannot guarantee that the composite index is optimally constructed.

On the other hand, the SR approach has the advantage of optimally fitting a statistical parametric model into crisis-event data and allowing us to rely on well-established statistical inferences. However, this approach also has the disadvantage of including only a limited number of information variables for predicting financial crises. Including too many explanatory variables in a predictive regression model would incur estimation inefficiencies and thus yield poor predictive performance. Moreover, the inclusion of a large number of explanatory variables would cause data losses in a typical situation where information variables may differ with data availability.

In this paper, for the purpose of predicting financial crises, we propose a new approach that combines both the SE and SR approaches. This new approach intends to maintain the advantages of both approaches and alleviate their disadvantages; therefore, we hope that the new approach more accurately predicts financial crises. In particular, we first categorize information variables into several sub-groups according to the information contents that the variables are expected to convey. We then construct sub-group indexes from the information variables belonging to the same sub-group. We utilize the SE approach to construct these sub-group indexes. Next, we include the sub-group indexes in the SR framework to predict the financial crises. With this combination approach, we can consider a large number of information variables without increasing the number of variables that are to be included by constructing sub-group indexes. Moreover, the SR framework in the second stage of the new approach allows for optimal fitting of a statistical parametric model as well as its associated statistical inferences.

The idea of constructing sub-group indexes has several advantages: First, it can limit the number of variables to be included in a regression analysis. Second, it may facilitate the economic interpretation of estimation and predictive results by grouping variables according to their economic information content. Third, it may potentially alleviate estimation inefficiencies arising from strong co-movements among variables with similar economic characteristics by using a single variable to represent them. Fourth, we are able to decompose the effects of a sub-group variable on the probability of a financial crisis into the effects of individual variables; to construct the sub-group variable, we use weights that are fixed and known. Last, assigning a variable for each sector would help balance the analysis, because including too many variables belonging to a certain sub-group and considering them individually (without constructing a sub-group variable) would yield results that are skewed toward the sub-group.

We apply the new approach for predicting sudden stops (SS) of capital flows to EMEs and compare its predictive ability with those of the SE and SR approaches. Indeed, it is of great interest to predict sudden stops of capital flows to EMEs at this present time, 2015/2016. The GFC that began in the U.S. in 2007/2008 affected not only advanced countries but also EMEs. As policy responses to the GFC, the U.S. and other advanced countries' policy makers actively utilized de facto zero policy interest rate as well as an unconventional monetary policy (UMP), which is often referred to as "quantitative easing" (QE). After a long period of the UMP, the Fed hinted that it would "normalize" its UMP in 2013 and started its normalization from December 2015 by raising the policy interest rate. Many EMEs have received significant amounts of capital inflows during the UMP period, and the normalization of the UMP may cause capital outflows from EMEs. As of the end of 2015, many EMEs are concerned about the possibility that this capital flow reversal may happen in an abrupt and unexpected way. This SS of capital flows to EMEs may pose a significant risk to the EMEs because previous large scale capital inflows may contribute to economic imbalances of recipient countries as argued by Reinhart and Reinhart (2008).[3] Furthermore, this negative impact from the SS due to the normalization would more significantly affect the EMEs that are decoupled from the U.S. economy.[4]

We apply the new approach as well as the two conventional approaches for predicting the SS of capital flows to EMEs and find that the new approach significantly outperforms conventional approaches. Although this relative outperformance of the new approach over conventional approaches should be confirmed with further financial crisis predictions in the future, this new approach suggests an alternative way to improve predictive ability. While finding useful indicators is obviously helpful for improving predictive ability, this paper suggests that devising an efficient method of processing information conveyed by the indicators can also be helpful for prediction.

The rest of this paper is organized as follows. In the next section, we present not only the new methodology but also the two conventional methods for expositional purposes. In Section 3, we explain the data and the variables to be used for our analysis. In Section 4, we present estimation results and compare the prediction performances. We conclude in Section 5.

2. Methodology

In this section, we explain the two conventional approaches for expositional purposes and then present the new methodology.

[2] Frankel and Saravelos (2012) classified the models for early waring system into four catergories, including the two approaches considered in this paper. The SE and SR approaches are more popular than the other two approaches.

[3] Reinhart and Reinhart (2008) argue that "Bonanzas are no blessing for advanced or emerging market economies. In the case of the latter, capital inflow bonanzas are associated with a higher likelihood of economic crises (debt defaults, banking, inflation and currency crashes)."

[4] A large body of literature exits on the relationship between CFs and economic growth. Examples include Aizenman, Jinjarak, and Park (2013), Arteta, Eichengreen, and Wyplosz (2001), BIS (2009), Caballero (2016), Choong, Baharumshah, Yusop, and Habibullah (2010), Eichengreen (2001), Henry (2007), Kose, Prasad, Rogoff, and Wei (2009), Reinhart and Reinhart (2008), and Vo (2010) among others.